

Patent
Atty. Dkt. 1.YNN/0151

IN THE CLAIMS

Claims 1-6, 20 and 31-33 are withdrawn from consideration pursuant to 35 U.S.C. 121. Please amend claims 7-19, 21-26, and 28-30 and enter new claims 43-53 according to the following replacement claim set. Please cancel claim 27.

1. (Withdrawn) A method of making antimicrobial fabrics comprising the steps of:
 - creating a free radical species on a surface of the fabric; and
 - reacting a polymerizable monomer with the free radical species to initiate graft polymerization of the monomer on the fabric surface, wherein the monomer has a functional group selected from antimicrobial groups, precursors to antimicrobial groups, and combinations thereof.
2. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of gamma irradiation polymerization techniques.
3. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of UV-assisted polymerization techniques.
4. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of flame-initiated polymerization techniques.
5. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of plasma-induced polymerization techniques.
6. (Withdrawn) A method of making antimicrobial fabrics comprising the steps of:
 - treating a fabric with ozone to form peroxide groups on the fabric;
 - decomposing the peroxide groups with an iron catalyst to form oxygen radicals; and
 - grafting a polymerizable monomer to the oxygen radicals on the fabric surface.

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7. (Currently Amended) The ~~method~~ fabric of claim [[6]] 23, wherein the monomer is a carboxylic acid.

8. (Currently Amended) The ~~method~~ fabric of claim 7, wherein the disinfectant is a peracid that is the derivative of the carboxylic acid, the method for producing the fabric further comprising[[ing]]es:

reacting the ~~grafted monomer~~ carboxylic acid with a mineral acid and hydrogen peroxide to form [[a]] the peracid on the fabric surface.

9. (Currently Amended) The ~~method~~ fabric of claim 7, wherein the monomer is acrylic acid.

10. (Currently Amended) The ~~method~~ fabric of claim [[6]] 23, wherein the monomer is selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.

11. (Currently Amended) The ~~method~~ fabric of claim [[6]] 8, wherein the peracid grafted to the fabric is regenerable, further comprising the method further comprises:

regenerating the peracid by exposing the fabric to mineral acid and hydrogen peroxide.

12. (Currently Amended) The ~~method~~ fabric of claim [[6]] 23, wherein the fabric is selected from the group consisting of cotton, linen, gauze, polyester, nylon, acrylic and blends thereof.

13. (Currently Amended) The ~~method~~ fabric of claim [[6]] 23, wherein the monomer has a nonpolymerizable functional group selected from carboxyl, amino, hydroxyl, sulphydryl, amido, and mixtures thereof.

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14. (Currently Amended) The method fabric of claim [[6]] 23, wherein the method of producing the fabric further compris[[ing]]es:

providing a polymerizable co-monomer along with the monomer to form a copolymer.

15. (Currently Amended) The method fabric of claim 14, wherein the copolymers are selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.

16. (Currently Amended) The method fabric of claim 14, wherein the copolymer contains a metal salt.

17. (Currently Amended) The antimicrobial fabric of claim 23, characterized in that the antimicrobial grafted fabric has sufficient antimicrobial disinfectant activity to kill microorganisms selected from the group consisting of gram- negative bacteria, gram-positive bacteria, mold, fungi and viruses.

18. (Currently Amended) The antimicrobial fabric of claim [[23]] 17, wherein the gram-positive bacteria are *Staphylococcus aureus*.

19. (Currently Amended) The antimicrobial fabric of claim [[23]] 17, wherein the gram-negative bacteria are selected from the group consisting of *Escherichia coli* and *Pseudomonas aeruginosa*.

20. (Withdrawn) The method of claim 6, wherein a disinfecting amount of the polymerizable monomer is grafted onto the fabric.

21. (Currently Amended) The antimicrobial fabric of claim [[23]] 8, wherein the antimicrobial grafted fabric comprises sufficient grafted polymerizable monomer peracid to detoxify pesticides.

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22. (Currently Amended) The antimicrobial fabric of claim [[23]] 8, wherein the antimicrobial grafted fabric comprises sufficient grafted polymerizable monomer peracid to detoxify chemical and biological weapons.
23. (Currently Amended) An antimicrobial fabric produced in accordance with a method comprising the steps of:
 - treating a fabric with ozone to form peroxide groups on the fabric;
 - decomposing the peroxide groups with an iron catalyst to form oxygen radicals; and
 - grafting a polymerizable monomer to the oxygen radicals on the fabric surface, wherein the grafted fabric comprises a disinfectant that is the polymerizable monomer or a derivative of the polymerizable monomer.
24. (Currently Amended) The antimicrobial fabric of claim 23, wherein the antimicrobial grafted fabric is formed into garments.
25. (Currently Amended) The antimicrobial fabric of claim 24, wherein the garments are selected from the group consisting of masks, scrubs, lab coats, and caps.
26. (Currently Amended) The antimicrobial fabric of claim 23, wherein the antimicrobial grafted fabric is formed into items selected from the group consisting of surgical drapes, bed sheets, bedding, privacy drapes, towelettes, hygiene wipes, dressings and bandages.
27. (Cancelled).
28. (Currently Amended) The antimicrobial fabric of claim 23, wherein the method is carried out without substantial disruption of interfiber adhesion of the fabric.

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29. (Currently Amended) The antimicrobial fabric of claim 23, wherein the method is carried out without substantial loss of fabric strength by the fabric.
30. (Currently Amended) The antimicrobial fabric of claim 23, wherein the method is carried out without substantial loss of tensile strength, tear resistance and abrasion resistance by the fabric.
31. (Withdrawn) The method of claim 6, wherein the treating step is carried out at a temperature between about 40 and 80°C.
32. (Withdrawn) The method of claim 6, wherein the step of treating the fabric with ozone is carried out for between 10 minutes and 4 hours.
33. (Withdrawn) The method of claim 6, wherein the polymerizable monomer is supplied at a concentration of between 1 and 50 percent by weight.
34. (New) A protective fabric for protection against chemicals produced in accordance with a method comprising the steps of:
 - treating a fabric with ozone to form peroxide groups on the fabric;
 - decomposing the peroxide groups with an iron catalyst to form oxygen radicals;
 - grafting a carboxylic acid to the oxygen radicals on the fabric surface; and
 - oxidizing the carboxylic acid to a regenerable percarboxylic acid, wherein the percarboxylic acid is covalently bonded to the fabric to provide the protection against chemicals.

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35. (New) The protective fabric of claim 34, wherein the step of oxidizing the carboxylic acid to the regenerable percarboxylic acid comprises reacting the carboxylic acid with a mineral acid and hydrogen peroxide to form the regenerable percarboxylic acid on the fabric surface.
36. (New) The protective fabric of claim 34, wherein the carboxylic acid is acrylic acid.
37. (New) The protective fabric of claim 34, wherein the percarboxylic acid covalently bonded to the fabric is regenerable by the method further comprising regenerating the percarboxylic acid after use by exposing the fabric to mineral acid and hydrogen peroxide.
38. (New) The protective fabric of claim 34, wherein the fabric comprises sufficient grafted percarboxylic acid to detoxify pesticides.
39. (New) The protective fabric of claim 34, wherein the fabric comprises sufficient grafted polymerizable monomer to detoxify chemical and biological weapons.
40. (New) The protective fabric of claim 34, wherein the fabric is selected from the group consisting of cotton, linen, gauze, polyester, nylon, acrylic and blends thereof.
41. (New) The protective fabric of claim 34, wherein the fabric is formed into garments.
42. (New) The protective fabric of claim 41, wherein the garments are selected from the group consisting of masks, scrubs, lab coats, and caps.
43. (Previously presented) The protective fabric of claim 40, wherein the fabric is formed into items selected from the group consisting of surgical drapes, bed sheets, bedding, privacy drapes, towelettes, hygiene wipes, dressings and bandages.

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44. (New) The protective fabric of claim 40, wherein the fabric is characterized as having disinfectant properties.
45. (New) The protective fabric of claim 34, wherein the method is carried out without substantial disruption of interfiber adhesion of the fabric.
46. (New) The protective fabric of claim 34, wherein the method is carried out without substantial loss of fabric strength by the fabric.
47. (New) The protective fabric of claim 34, wherein the method is carried out without substantial loss of tensile strength, tear resistance and abrasion resistance by the fabric.
48. (New) The protective fabric of claim 34, further characterized in that the fabric provides protection against microorganisms.
49. (New) The protective fabric of claim 48, wherein the microorganisms are used in biological weapons.
49. (New) The protective fabric of claim 48, wherein the fabric has sufficient percarboxylic acid grafted to the fabric to kill microorganisms selected from the group consisting of gram- negative bacteria, gram-positive bacteria, mold, fungi and viruses.
50. (New) The protective fabric of claim 49, wherein the gram-positive bacteria are *Staphylococcus aureus*.
51. (New) The protective fabric of claim 49, wherein the gram-negative bacteria are selected from the group consisting of *Escherichia coli* and *Pseudomonas aeruginosa*.

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52. (New) The protective fabric of claim 49, wherein the fabric is formed into hygiene wipes.

53. (New) The protective fabric of claim 49, wherein the fabric is formed into products useful for household disinfection.